FreeSpace® DS 16S/DS 16SE Loudspeakers

TECHNICAL DATA SHEET

Product Overview

Bose® FreeSpace® DS 16S and FreeSpace DS 16SE loudspeakers are high-performance, surface-mount loudspeakers designed for background music and speech reproduction in a wide range of commercial applications including retail, restaurant and hospitality establishments.

These 16-watt loudspeakers can provide coverage both indoors (DS 16S) and outdoors (DS 16SE). Horizontal or vertical mounting options offer installation flexibility. The DS 16S and DS 16SE loudspeakers meet numerous standards for combination music and evacuation systems around the world when used with the optional junction boxes.

Product Information

FreeSpace DS 16S and DS 16SE surface-mount loudspeakers are engineered for installation on walls or other solid surfaces. Simple 1→2→3 installation: (1) Wire and attach the wall bracket (2) Secure the loudspeaker to the wall bracket with one screw (3) Snap the wire connector into the wall bracket. The included bracket allows for horizontal or vertical mounting positions, each with either pitch or yaw adjustment.

The DS 16S and DS 16SE loudspeakers can be used as 8-ohm, 16-watt loudspeakers or 70/100V loudspeakers. An easy-to-access thumbwheel allows taps to be set quickly and simply without the use of tools.

Performance of the FreeSpace DS 16S and DS 16SE loudspeakers can be maximized through the use of the recommended Bose loudspeaker equalization resident in select Bose electronics or by using other equipment with parametric equalization. The loudspeakers can be used out of the box with an 80-Hz high-pass filter when recommended loudspeaker equalization is not used.

The DS 16S and DS 16SE loudspeakers are acoustically compatible with FreeSpace Model 16 flush-mount loudspeakers. They can be integrated on the same loudspeaker line.

The contemporary styling easily blends with a wide variety of décors.

Key Features

- Clear, intelligible music and speech reproduction
- Full-range response from 90 Hz – 16 kHz
- 170°H x 160°V coverage pattern (loudspeakers mounted horizontally)
- Single 2.25" (57mm) full-range driver
- Simple 1→2→3 installation
- Mounting hardware allows for horizontal and vertical orientation with adjustable pitch or yaw (up to 30°)
- Indoor (DS 16S) and outdoor (DS 16SE) versions
- Integrated multi-tap transformer provides easy-to-change tap settings without tools:
  70V – 1W, 2W, 4W, 8W, 16W
  100V – 2W, 4W, 8W, 16W
- Can be used as an 8Ω, 16W loudspeaker
- Can be combined with the FreeSpace Model 16 ceiling-mount loudspeaker on the same line
- Contemporary styling; available in black or white and can be painted
- Listed to ANSI/UL 1480-2005
- CE mark

Applications

The FreeSpace DS 16S and DS 16SE loudspeakers are well-suited for permanent installations in:

- Retail stores
- Transportation facilities
- Hospitality venues
- Concourses
- Restaurants
- Houses of worship

TECHNICAL DATA SHEET

Detailed Product Specifications

Power handling[1]	16W
Nominal Impedance (transformer bypass)	8Ω
Sensitivity[2] (at 1W @ 1m)	84 dB-SPL
Maximum SPL[3] (pink noise @ 1m @ rated power)	96 dB-SPL 102 dB-SPL (Peak)
Frequency range[4] (-3 dB)	90 Hz – 16 kHz
Beamwidth (-6 dB point, average 1– 4 kHz)	170°H x 160°V

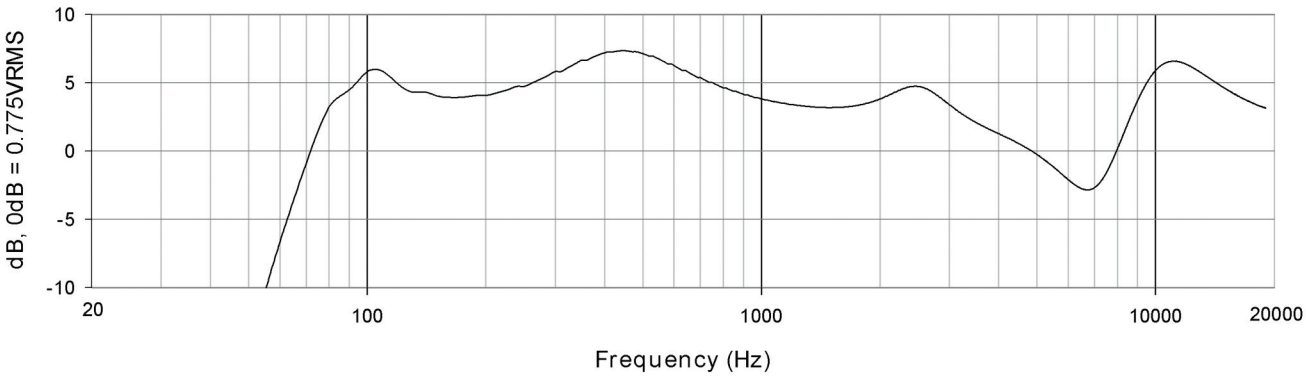
[1–4] See "How our Loudspeakers are Measured" on page 7.

Additional Product Information

Performance of the FreeSpace® DS 16S and DS 16SE loudspeakers can be maximized through the use of the recommended Bose® loudspeaker equalization resident in select Bose electronics or by using other equipment with parametric equalization.

The loudspeakers can be used out of the box with an 80-Hz high-pass filter when recommended loudspeaker equalization is not used.

Recommended Loudspeaker Equalization Curve



FreeSpace® DS 16S/DS 16SE
Loudspeakers

Driver complement:
One 2.25" (57mm) driver

Construction features:
Enclosure: Injection-molded polypropylene
Grille: Powder-coated steel

Dimensions:
Loudspeaker only:
4.6"D x 9.9"W x 4.9"H (117mm x 250mm x 124mm)
Loudspeaker with bracket:
6.4"D x 9.9"W x 4.9"H (161mm x 250mm x 124mm)

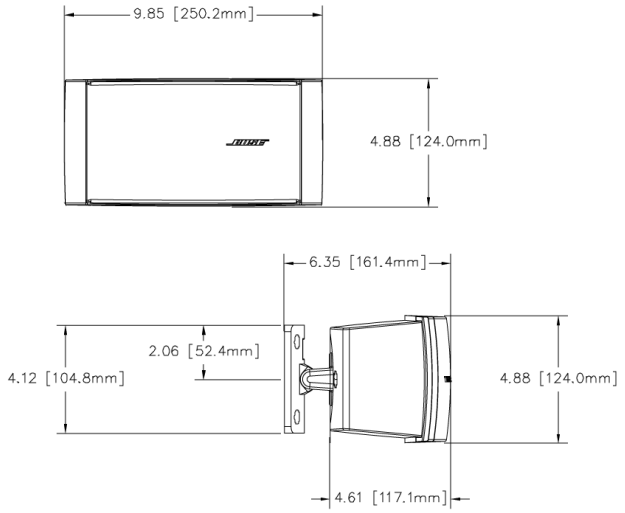
Weight:
Product: 4.0lb (1.8kg)
Shipping: 5.1lb (2.3kg)

Package contents:
Loudspeaker, mounting bracket and installation guide

Finish:
Textured black or white finish with a contoured, powder-coated steel grille. Both the enclosure and grille can be painted.

Connectors:
The included mounting bracket features a three-terminal barrier strip. Optional junction boxes include a ceramic connector and a thermal fuse for use when required.

Mechanical diagrams:



Design Recommendations

When creating a design that uses the FreeSpace® DS 16S and DS 16SE loudspeakers, you should consider the following:

- The FreeSpace DS 16S and DS 16SE loudspeakers are engineered for background music applications. For foreground music applications, you should consider FreeSpace DS 100SE loudspeakers.
- Recommended mounting height is between 8 and 20ft (2.4 and 6.1m).
- Provide at least 20ft (6.1m) of space between adjacent loudspeakers for typical applications.
- Generally, the FreeSpace DS 16S and DS 16SE loudspeakers should be pitched downward between 5 and 30 degrees.
- Always add 25% headroom to your amplifier to accommodate various types of program material.
- Maximum SPL for a typical application is between 85 and 90 dB-SPL.

Coverage	Loudspeaker Spacing Distance
Premium	25ft | 7.5m
Standard	30ft | 9.0m
Minimum	35ft | 10.5m

Total system sound pressure level varies based on the mounting height, loudspeaker tap and room acoustics. For typical applications, use the chart below to determine the total sound pressure level that will be achieved using the DS 16S and DS 16SE loudspeakers.

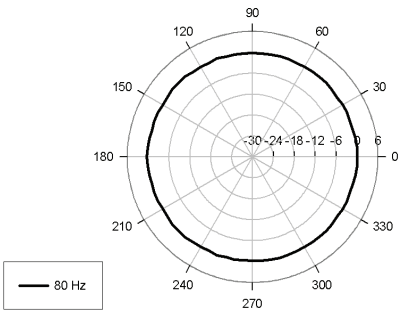
DS 16S | DS 16SE									
Mount Height	m	2.4	3.0	3.6	4.2	4.8	5.5	6.1	
	ft	8	10	12	14	16	18	20	
TAP (W)	1*	78	77	77	76	75	74	73	dB-SPL
	2	81	80	80	79	78	77	76	
	4	84	83	83	82	81	80	79	
	8	87	86	86	85	84	83	82	
	16	90	89	89	88	87	86	85	

*1-watt tap available only in 70V mode.

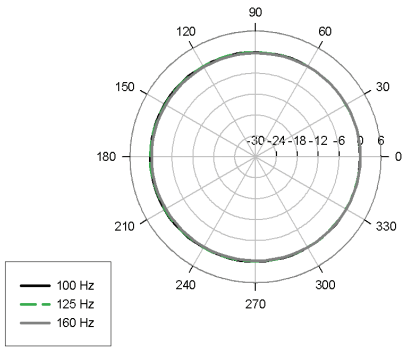
For more detailed information, refer to the FreeSpace DS 16S and DS 16SE loudspeakers Design Guide.

Polar Plots ⅓ Octave Horizontal

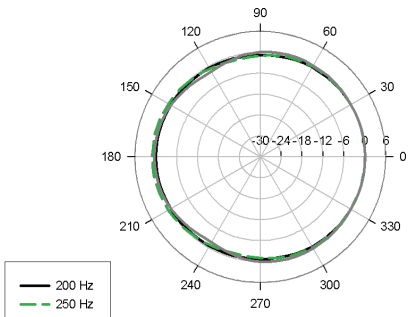
63 Hz Octave Band



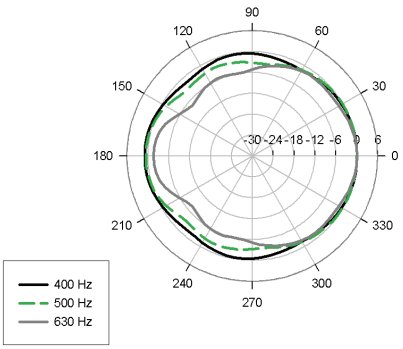
125 Hz Octave Band



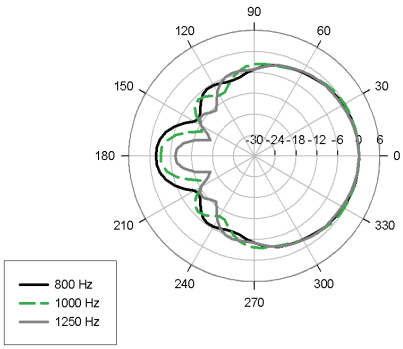
250 Hz Octave Band



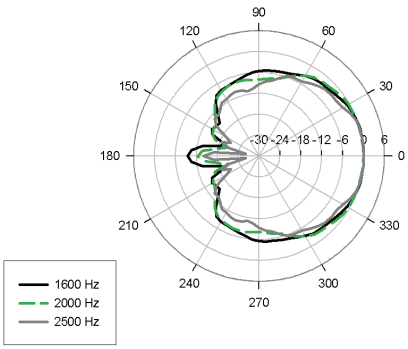
500 Hz Octave Band



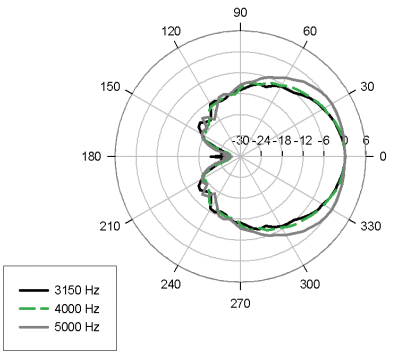
1000 Hz Octave Band



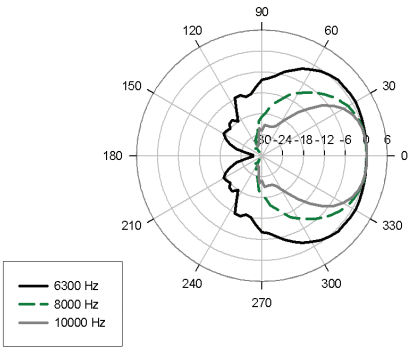
2000 Hz Octave Band



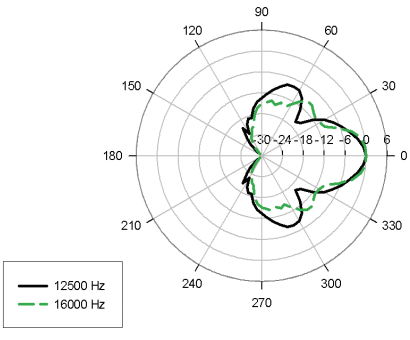
4000 Hz Octave Band



8000 Hz Octave Band

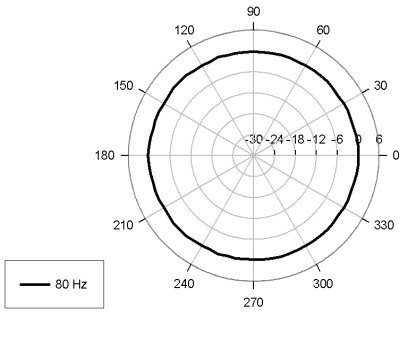


16000 Hz Octave Band

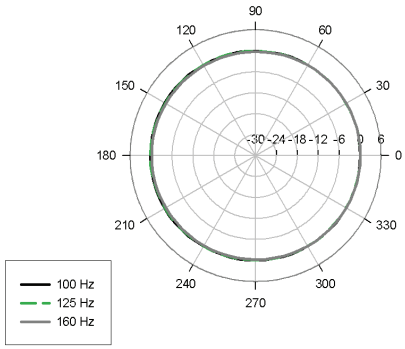


Polar Plots ⅓ Octave Vertical

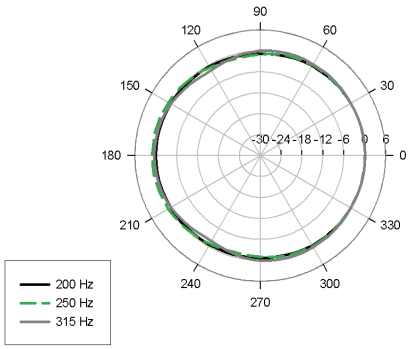
63 Hz Octave Band



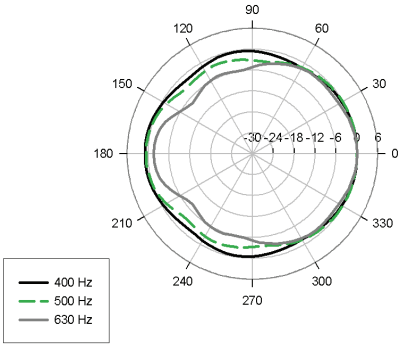
125 Hz Octave Band



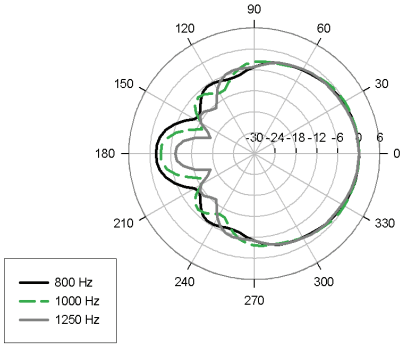
250 Hz Octave Band



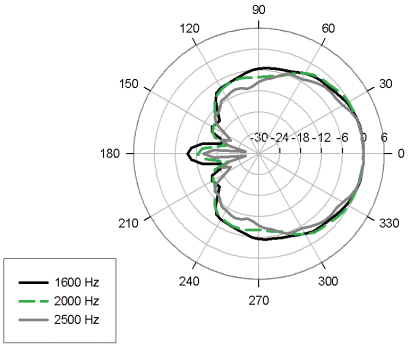
500 Hz Octave Band



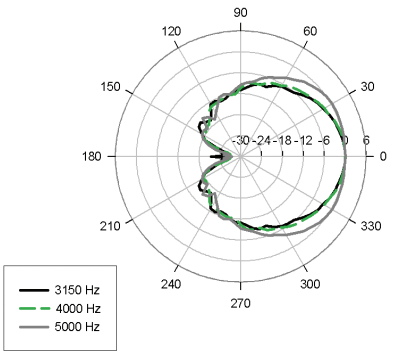
1000 Hz Octave Band



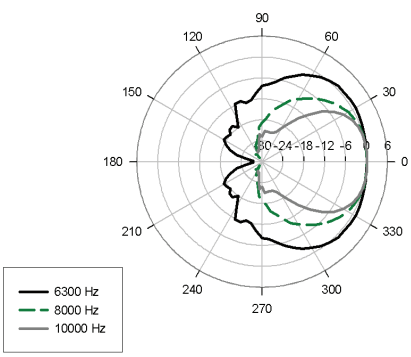
2000 Hz Octave Band



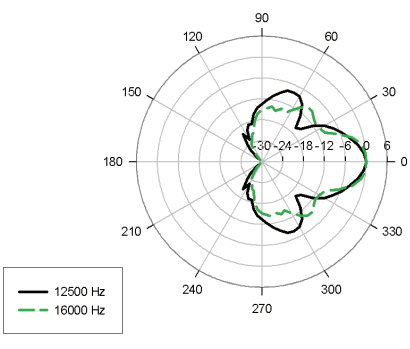
4000 Hz Octave Band



8000 Hz Octave Band



16000 Hz Octave Band



Engineers' and Architects' Specifications

Each loudspeaker shall be a 16-watt, ported loudspeaker utilizing one 2.25" (57mm) full-range driver for installation on walls or other flat, solid surfaces.

The driver shall have a nominal rated impedance of 8 ohms and shall be wired in parallel with a line voltage matching (step-down) transformer with a level selector appropriate for various output taps. The loudspeaker input connections will allow for direct connection to either 70V, 100V or low-impedance amplifiers.

Exposed cosmetic surfaces of the loudspeakers shall be paintable, and the acoustically transparent grille component shall be formed of powder-coated steel.

Each loudspeaker shall have a bandwidth of 90 Hz – 16 kHz and a maximum acoustic output of 96 dB-SPL referenced to a full-bandwidth pink noise input at 1 meter at the loudspeaker's rated power. The input connection shall consist of a three-position barrier connector on the included mounting bracket. Each loudspeaker shall be wired to the mounting bracket via a four-pin, pre-wired connector.

Power settings available shall be: 1W, 2W, 4W, 8W, 16W @ 70V; 2W, 4W, 8W, 16W @ 100V; and 16W @ 8Ω (when referenced to IEC noise for 100 hours). The nominal dispersion shall be 170°H x 160°V at -6 dB (average 1 – 4 kHz).

When used with optional junction boxes, which include a ceramic connector and a thermal fuse, the loudspeakers shall meet numerous standards for combination music and evacuation systems around the world.

The loudspeakers shall be the Bose® FreeSpace® DS 16S and DS 16SE loudspeakers.

Safety and Regulatory Compliance

The FreeSpace DS 16S and DS 16SE have passed extensive testing and comply with the following specifications and uses:

Listed to ANSI/UL 1480-2005

- Fire Protective Signaling Use – UL Category UUMW, File Number S 3241.
  Control Number 42S9 when installed with a junction box (on-wall or in-wall).
  Not for use with DC-supervised systems.
- General-Purpose Use – UL Category UEAY, File Number S 5591 Control Number 3N89.
- The DS 16SE is suitable for use outdoors in wet locations.
- The DS 16S is suitable for use indoors in damp locations.
- Suitable for installation using Class 1, Class 2 or Class 3 wiring methods in accordance with NFPA 70, *National Electric Code,* 2002, Article 640.
- Suitable for use with fire alarm circuit wiring methods in accordance with NFPA 70, *National Electric Code,* 2002, Article 760.

The DS 16S and DS 16SE also have been designed to the requirements defined in the following European regulatory specification for combination systems:

- British Standard Code of Practice BS 5839, Part 8.
- Tested to IEC60268-5.

Limited Warranty

The FreeSpace DS 16S and DS 16SE loudspeakers are covered by a five-year transferable limited warranty.

FreeSpace® DS 16S/DS 16SE
Loudspeakers

TECHNICAL DATA SHEET

Product Codes

FreeSpace DS 16S loudspeaker – Blk	PC 040783
FreeSpace DS 16S loudspeaker – Wht	PC 040784
FreeSpace DS 16SE loudspeaker – Blk	PC 040785
FreeSpace DS 16SE loudspeaker – Wht	PC 040786

Accessories

Bracket assembly – Blk	PC 315253-001
Bracket assembly – Wht	PC 315253-002
Trim plate kit – Blk	PC 315266-001
Trim plate kit – Wht	PC 315266-002
On-wall junction box (6 pack) – Blk	PC 041865
On-wall junction box (6 pack) – Wht	PC 041866
In-wall junction box (6 pack) – Blk	PC 041867
In-wall junction box (6 pack) – Wht	PC 041868

Replacement Parts

DS 16S/SE bracket wall mount – Blk	PN 295891-001
DS 16S/SE bracket wall mount – Wht	PN 295891-002
DS 16S/SE bracket speaker arm w/screw – Blk	PN 295892-001
DS 16S/SE bracket speaker arm w/screw – Wht	PN 295892-002
DS 16S/SE bracket extended speaker arm w/screw – Blk	PN 299564
DS 16S/SE bracket extended speaker arm w/screw – Wht	PN 299565
Grille w/fasteners (indoor) – Blk	PN 295896-001
Grille w/fasteners (indoor) – Wht	PN 295896-002
Grille w/fasteners (outdoor) – Blk	PN 298083-001
Grille w/fasteners (outdoor) – Wht	PN 298083-002
Logo – Blk	PN 303039-001
Logo – Wht	PN 303039-002
Endcap – Blk	PN 295897-001
Endcap – Wht	PN 295897-002
2.25" (57mm) Driver (indoor)	PN 298081
2.25" (57mm) Driver (outdoor)	PN 298082

How our Loudspeakers are Measured

1. Power handling
Full-bandwidth pink noise, meeting the IEC Standard #268-5, is applied to the loudspeaker and amplified to a level at the loudspeaker terminals corresponding to the power handling of the loudspeaker. The loudspeaker must show no visible damage or measurable loss of performance after 100 hours of continuous testing.

2. Sensitivity
Full-bandwidth pink noise is applied to the loudspeaker with its active equalization curve and amplified to a level at the loudspeaker terminals corresponding to 1 watt as referenced to the nominal impedance. The average sound pressure level (dB-SPL) is measured at 1 meter from the speaker in an anechoic environment.

3. Maximum SPL
Full-bandwidth pink noise is applied to the loudspeaker with its active equalization curve and amplified to a level at the loudspeaker terminals corresponding to the long-term rated power handling of the speaker. The average sound pressure level (dB-SPL) is measured at 1 meter from the speaker in an anechoic environment.

4. Frequency range
Sine waves are injected into the loudspeaker, and the level is adjusted to 1 watt, as referenced to the nominal impedance, and the level measured at 1 meter. Resulting graph is smoothed by 0.05 octave-band.

All information subject to change without notice.
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